New Zealand Cyrtidae (Diptera) and the Problem of the Pacific Island Fauna.

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DURING THE PREPARATION of a review of the Australian Cyrtidae some New Zealand material was used for comparison. The study of this material has shown that a review of New Zealand cyrtids is also required. For the clarification of some systematic problems the author was forced to collect all available information about New Zealand cyrtids, and to write a short, preliminary review of them. The publication of this review, the author thinks, will be useful for New Zealand dipterists. The author quotes the descriptions *in extenso*, because they are dispersed mostly in old, not very easily accessible publications and it will facilitate the undertaking of a more extensive study of New Zealand members of the family.

Comparison of the fauna of cyrtids of New Zealand and Australia has given material for some general conclusions, which can be used in solving the problem of the Pacific fauna.

The representation of Cyrtidae in New Zealand is very poor: 1 species of *Apsona*, 3 species of *Helle*, and 3 species of *Oncodes*, representing three different subfamilies, but it has some significance in the problem of the origin of the Pacific fauna.

To the present time representatives of the genera *Apsona* (Panopinae) and *Helle* (Philopotinae) are not known in Australia and there is no reason to believe that they will be found here in the future.

The author has had an opportunity to study some specimens of *Apsona muscaria* Westwood, the only species of the genus if we do not include *Apsona caerulea* Brunetti from Brazil. (Brunetti has not compared his species with *Eulonchus* and it is difficult to tell to which genus the Brazilian species belongs.) He has found an astonishing similarity between *muscaria* and *Eulonchus smaragdinus* Gerst. from California. The size, shape, colour, structure of integument, venation, hairs, and many other characters are so similar that they can almost be regarded as belonging to the same species. Only detailed study under a lens (see below) shows that they are different, but the generic difference between them is in doubt.

A comparison of all *Apsona* and *Eulonchus* species will doubtlessly show that *Apsona muscaria* Westw. and *Eulonchus smaragdinus* Gerst. are remarkably close or possibly congeneric. Lack of material does not permit the author to state that the two genera are synonymous, but there is no doubt about their very close relationship. The species of the complex *Eulonchus-Apsona* are distributed in New Zealand, North America and South America, but are quite absent from Australia.

The genus *Helle* is comparatively very well represented in New Zealand (three species), whereas no representatives of the whole subfamily Philopotinae are recorded for Australia. Elsewhere the distribution of the subfamily is confined to widely separated areas. In America the genus *Helle* is absent, but *Philopota*, a

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closely related genus, is present.

The genus *Oncodes* is cosmopolitan, but none of the species has been found to occur both in Australia and New Zealand.

Thus the information we have on the New Zealand Cyrtidae would indicate a closer relationship, with respect to their origins, between the New Zealand and American fauna than between the New Zealand and Australian.

Let us now examine the general features of the dipterous fauna of New Zealand. First the absence, or extremely poor representation, of some families must be recorded: *Nemestrinidae*, *Apioceridae*, *Scenopinidae*, *Mydaidae*, *Conopidae* are quite absent; some large families, such as *Bombyliidae*, *Leptidae*, are represented by one species each. What is the cause of this absence? It is quite evident that all these and similar elements of the fauna were present in New Zealand in different geological periods.

During its geological history New Zealand has been repeatedly covered by the sea, but since mesosoic time it has been definitely above the sea and part of a large continent, which was situated mainly westwards of the present position of New Zealand. Australia is also a part of this earlier continent.

In Trias-Jura time New Zealand was more extensive, reaching to New Caledonia or even farther northwards, eastwards reaching the Chatham Islands and southwards to the Campbell Islands.

The main ranges of mountains were created during the Pliocene. The uplift was continued in the Pleistocene. This was the time of the greatest glaciation. The end of the Pleistocene was a time of subsidence when the sea covered the sea-shore zone to a height of 40–150 meters above present sea level. This subsidence changed to slow uprising which has continued.

Thus New Zealand has been connected with land-masses which have representatives of the above mentioned families in great number, and such families were destroyed during the process of New Zealand's isolation.

The causes of this destruction were various: 1) some elements adapted to the arid area conditions were eliminated by the absence in New Zealand of deserts and by very high humidity, 2) some elements were destroyed by the glaciation, which was not very intense, but which changed fundamentally the ecological conditions.

When the author was writing his *Review of Australian Apioceridae* (Paramonov, 1953), he was restricted by the scope of the theme and could not discuss the problem of the absence of the family in New Zealand; now it will be useful to express his ideas in a more extensive form.

If we accept the destruction of apiocerids by glaciation, we must examine theoretically the three following alternatives.

1. A large continent (for example, Australia or South America) is undergoing glaciation. Will the result of glaciation be the destruction of the fauna of the continent? Most probably not, because the continent extends from north to south for a very great distance. We cannot suppose glaciation to cover the whole continent. On one or the other end of it there will exist much more mild climatic conditions, which will permit the existence of the different elements of the fauna. Such glaciation cannot wipe out the fauna—the animals will only migrate to the warmer areas or strips of land or "pockets."

If we suppose the whole of the state of Victoria, from the Kosciusco summit to sea level to be covered with snow and ice, we can be sure that in the area of Cape York there will be areas serving as "refugiums" for the different elements of the fauna. Never will the fauna be completely extinct. After the end of glaciation the animals will migrate back into Victoria. The glaciation can cause maximally only the impoverishment of the fauna and temporarily the change of its spatial distribution.

2. We will have a quite different picture if the glaciation covers a not very large island

(for example Tasmania) and is strong and prolonged—the extinction of the fauna will very probably occur. However, if the island is part of a long chain of islands, there is a good chance of reimmigration after the end of glaciation.

3. If we have some large islands with their axis in a north–south direction, and these islands are isolated by very broad ocean areas from all continents and islands (e.g., New Zealand), the extinction or impoverishment of the fauna during strong glaciation is very probable.

From these explanations, I think, it is evident that the comparison of New Zealand with Australia or South America is not well grounded. The general conditions are very different. In New Zealand there is not the possibility of reimmigration of the fauna.

Let us now consider the glaciation. In Australia there never was a glaciation which covered extensive landmasses as by a shield. The glaciation touched only the mountain area and as a result no complete fauna or even the outstanding elements of parts of that fauna were destroyed. There was only temporary redistribution of the elements of the fauna in space.

I think we have a similar condition also in New Zealand, where the glaciation was never so strong as to be able to destroy the whole fauna. Very possibly glaciation was the real cause of the extinction of the apiocerids, because heavy snowfall usually is connected with diminishing temperature, and masses of snow and ice with low temperatures can cause the death of the apiocerids.

But (and this is my main idea) it is not just the glaciation which destroys the whole fauna or large parts of it. Glaciation is the result of a specific combination of meteorological conditions when the snow accumulates more and more, beginning to form ice-shields and penetrating little by little into the valleys, but it does not mean the destruction of the fauna or the depression of its elements.

In Patagonia and Chile we have at present the coexistence of a huge mass of ice and, at a distance of 2–3 hundred metres, a huge, very tall forest. Here we have equilibrium between the elements causing the glaciation and deglaciation, and this equilibrium has existed for at least 100–200 years because the forest near the masses of ice has required such time for growth.

However, there is another type of meteorological combination which can destroy the essential parts of the fauna without glaciation —the periodical or permanent lowering of the temperature in the winter. It is enough to have 5–10–25 years of winters with the temperatures under 0° C., and all the insect pupae in the superficial layer of the soil will be frozen. The apiocerids are a very old group from very warm countries. They have not developed adaptations to cold winters, their pupae always lie shallowly in the soil. A number of winters with temperatures under 0° C. can cause the complete extinction of the apiocerids. It will be useful to remember that in Siberia (Yakutsk area) in the coldest point of the whole world (the temperature in the winter drops to −70° C.) the snowfall is very small, usually so small that horses can find food under the snow during the whole winter.

In such a way we can explain the extinction of apiocerids in New Zealand, not only directly by strong glaciation but also by a series of very cold winters which can destroy those elements of the fauna without adaptation to low temperatures. In my review of Australian Apioceridae I mentioned only glaciation as the cause of impoverishment of the New Zealand fauna, but the above explanation should be taken into consideration, also.

The presence of a very small number of species representing the three subfamilies of cyrtids in the New Zealand fauna shows us that the fauna is very impoverished. The main cause is probably the same as for the other families: glaciation, low temperatures in the winter, and high humidity.

The remnants of the fauna show, however, rather high specialization. It is quite evident

that before the glaciation, etc., New Zealand had many rather peculiar elements. These elements do not show a very close relationship with the Australian fauna, but reflect more an affinity to the American fauna and possibly to the fauna of the Antarctic continent.

At the present state of our knowledge it is difficult to state the cause of the glaciation in New Zealand. If we accept Wegener's theory of the drifting continents, we can accept the drift of New Zealand to the polar area, which destroyed the more warmth-liking elements, and then back-drift to the warmer areas. As a result of the very marked isolation by the vast surface of ocean there was no possibility of receiving again the warmth-liking elements.

If we examine the families of Nematocera and compare them with those of Australia, we will see that no families of Nematocera are absent from the New Zealand fauna, some of them even (for example *Tipulidae*) are represented much better than they are in Australia. In general the nematocerous families are more typical of cold areas throughout the world. This comparative richness of the New Zealand fauna in Nematocera is in close harmony with the drifting theory: New Zealand has received its cold-liking elements from the Antarctic area.

However, there are facts in contradiction to this idea. The family Cordyluridae, which is typical of the cold areas of the Northern Hemisphere, is absent in New Zealand; also the genus *Tapeigaster* (Neottiophilidae) is absent though nine species of the genus are very common in Australia, living on mushrooms. Also, not without significance is the absence of the families Heteroneuridae, Sepsidae, Tanypezidae, and Thyreophoridae (the last family has some representatives in Australia, which live mostly, in the winter, on carrion). The absence of these flies possibly can be explained without difficulty, but, at the present, we do not have enough data about their distribution and life histories to explain it.

In order to attack the problem as a whole we must also consider the presence of some other elements, because the presence of these elements is also important to an understanding of the problem. Whence came the remnants of the warmth-liking elements? Only very few of them are true endemic species of New Zealand, the greater part of the species no doubt did not originate in New Zealand, but only persist there (for example the genus *Helle*). Probably the origin of similar forms was connected with the Antarctic land masses. If we reject the idea of the drift of continents it will be very difficult to explain the origin of forms such as the genus *Helle*. The distance between the Antarctic land masses and New Zealand is so great that if we suppose that the position of the south pole changed so that the whole Antarctic continent was situated in latitudes which would permit the existence of animals adapted to a warm climate, New Zealand would be situated in the tropical or equatorial area. However, there are no equatorial or tropical elements in its fauna (and flora).

We can imagine the complicated relations between faunas if they changed their geographical positions, but if we accept immovability of the continents, an explanation cannot be found. The theory of land-bridges of the authors of the last century is quite unacceptable, because it contradicts much geological data.

In thus expressing his ideas the author is not definitely convinced in their correctness, however, from the material which he posseses the drifting theory of the continents is more acceptable than any other theory. Only an examination of all elements of the flora and fauna of New Zealand can furnish a firm basis for a correct interpretation, so we are still very far from this goal. However, a working theory is useful for progress of our knowledge.

Subfamily *PANOPINAE*

Genus APSONA Westwood

1876. Ent. Soc. London, Trans. 1876: 510.

Type species: *A. muscaria* Westwood.
Westwood writes:

Genus novum *Panopi* et *Lasiae* affine, differt antennis apice longe aristatis; proboscide longitudine mediocri, cellulis duobus posticis basi a venulâ unicâ basali pedicellatis.

Caput rotundo-transversum; oculis maximis antice conjunctis, setosis. Ocelli 3 in tuberculum parvum positi, verticales. Antennae in medio faciei insertae, articulis duobus basalibus parvis, ultimo basi elongato-ovato, apice in setam longam tenuem producto. Proboscis elongata, thoracis longitudine, apice bilabiato. Alae venis fere ut in *Lasiâ* et *Panope* dispositis, cellulâ autem curvatâ apicali e venulâ tertiâ postcostali pone cellulam angustam mediam discoidalem emissâ; cellulâque triangulari etiam basi pedicellatâ. Pedes graciles; abdomen fere globosum. Color metallicus.

Apsona muscaria Westwood

1876. Ent. Soc. London, Trans. 1876: 510. (pl. 5, fig. 2).

Westwood writes:

Valde convexa, nitida, sublente tenuissime coriacea, cupreoviridis, luteo-pubescens, proboscide et antennis nigris, pedibus luteoflavis, femoribus in medio obscurioribus; alis hyalinis, venis nigris.

Long. corp. lin. 4; probosc. lin. 2; expans. alar. lin. 8½.

Habitat in Novâ Zelandiâ. In mus. Hopeiano Oxoniae.

Body metallic green, shining. Legs (excluding coxae), halteres and anterior spiracles yellow, proboscis brown. Whole body, including eyes, with very dense, erect, yellowish hairs. Squamae alaris transparent, with yellow rim and also yellowish-haired. Empodium and pulvilli of same size, form and colour, yellowish. Wings with a very well developed venation, only the branches of M towards the hind margin evanescent. Alula absent. Anal cell long, petiolated. Lower basal cell M is distinctly narrower and longer than the upper basal cell R. Fourth posterior cell (subdiscal) is triangular, petiolated at base, connected to the hind margin by a short vein. Discal cell extremely long, slightly broadened towards the apex. Both branches of R_4 and R_5, short-petiolated. First posterior cell is extremely long, the cross-vein r-m is beyond the apex of the discal cell, another cross-vein is situated at its base.

The author has seen specimens from Arthur's Pass, New Zealand, 23. i. 1928 (A. Philpott).

A comparison with *Eulonchus smaragdinus* gives many details of this species, which were absent in the short description of Westwood.

1. Proboscis in *Eulonchus* is extremely long, in normal position directed backwards under the body and protruding beyond the apex of abdomen on the side of abdomen, in *Apsona* it does not reach the apex of the abdomen. This character cannot be regarded as generic because the length of proboscis is variable in Diptera in both sexes and individually rather strongly, so the structure of proboscis and palpi is quite similar in both species.
2. Head in *Apsona* is more declined than in *Eulonchus*, in which it has a nearly normal position in relation to the thorax.
3. Face in *Eulonchus* is turned downwards, in *Apsona* in oblique position.
4. Antennae in *Apsona* are inserted at a distance from the ocellar triangle, about as long as the latter, in *Eulonchus* nearly in the middle between the ocelli and the mouth.
5. Extremely fine strip separates the eyes above and below the antennae in *Eulonchus*, in *Apsona* they touch below the antennae.
6. Ocellar triangle is short, high, prominent in *Eulonchus*, in *Apsona* longer, broader and flat.
7. Occipital part of head in profile is very narrow above in *Apsona*, in *Eulonchus* it is rather broad.
8. In *Eulonchus* all tibiae on outer side have an acute prolongation of the edge, in *Apsona* the edge is nearly round.
9. Subdiscal cell is touching, basally, the lower basal cell in *Eulonchus*, in *Apsona* it is separated from the lower basal cell by a rather long petiole.
10. Tergites in *Eulonchus* with very short

yellowish hairs, in *Apsona* with long ones.

All these characters have a relative value but the striking similarity is quite dominating.

Apsona caerulea Brunetti

1926. Ann. and Mag. Nat. Hist. IX, 18: 581.

Brunetti writes:

Head. Eyes with long, dense, bright rufous-brown pubescence, apparently contiguous, but actually sufficiently separated to show a very narrow shining metallic blue space between them throughout, from the shining, almost blue-green frons bearing long, black, rather shaggy hair to the narrow shining black triangular frons. Antennae elongate, very slender, first joint very short, cylindrical, brown with a little grey dust; second much thicker, nearly as broad as long, subcylindrical, brown, with some stiff bristly hairs at tip; third very slender, pale yellow, nearly three times as long as second, basal half cylindrical, very much narrower than second joint, apical half elongate conical, narrowed at base, with long fine apical arista. Proboscis long, slender, *Lasia*-like, sheath bright shining metallic blue, much longer than full length of body, black. Occiput metalic blue, with long shaggy dark grey hair.

Thorax shining metallic blue with green reflections and long, rather coarse, blackish hair, more greyish towards sides. Scutellum more than twice as broad as long, with concolorous pubescence, hind margin gently curved, with more whitish pubescence.

Abdomen shining metallic blue, with rather long, fine, black pubescence. Two peculiar and conspicuous small patches of much denser black hair on discs of second, third, and fourth segments, well separated. Belly shining violet, with black pubescence.

Legs. Femora and tibiae shining dark brown, with a little fine black pubescence; tarsi yellowish (except the black tips), with yellowish pubescence, which latter also occurs on inner sides of tibiae on about apical half.

Wings quite clear yellowish grey; venation normal except fork of third vein much more upturned than in type-species, and fourth posterior cell almost contiguous at its pointed base with tip of second basal cell. All endings of fourth vein not reaching wing-margin. Alar squamae yellowish, bare, black-fringed; thoracal squamae ferruginous, with rather long shaggy depressed whitish hair. Halteres concealed.

Length 7½ mm., proboscis 9 mm.

A unique of uncertain sex in the British Museum, Minas Geraes, Brazil (Rogers), from the Saunders collection. The only previously known species is *muscaria*, Westw., the genotype from New Zealand.

Subfamily *PHILOPOTINAE*

Genus HELLE Osten-Sacken

1896. Ent. Monthly Mag. 32: 16.
Hutton, 1901. New Zeal. Inst. Trans. 33: 28.

Type species: *H. longirostris* Hudson.

Osten-Sacken writes:

Eyes glabrous, contiguous above the antennae as far as the ocellar triangle. Three ocelli. Antennae inserted about the middle of the head (seen in profile), very small; second joint incrassate at the base and attenuated beyond it in the shape of an arista-like prolongation. Proboscis elongate. Hind part of the head swollen. Thorax gibbous; prothoracic lobes contiguous along a rather long suture, on both sides of which they expand hindwards, so that the hind margin of the prothorax shows a deep emargination. Neuration almost complete; a single submarginal cell; an elongate, somewhat pentagonal discal cell; four posterior cells, incomplete in consequence of the post-discal veins not reaching the margin; two distinct basal cells; the anal cell closed long before the margin, its petiole stunted a little before reaching the margin. Tegulae large. Legs smooth, without spurs; tarsi but little shorter than the tibiae; joints three and four are the shortest, both together nearly equal the first in length. Three pulvilli. Abdomen oval, with the first segment short; the five other dorsal segments longer and nearly of the same length, with coarctations at the incisures.

Hutton adds, "The neuration closely resembles that of *Megalybus pictus* Westwood, Trans. Ent. Soc. London, 1876, pl. v. fig. 4a."

KEY TO THE NEW ZEALAND SPECIES OF HELLE

1. Larger species, length of body about 7 mm. Prothoracic plates not touching, always separated by one rather broad furrow. Yellowish-red species, with black median longitudinal stripe on mesothorax and two lateral ones, abbreviated in the presutural area. . . . . **rufescens** Brun.
   Smaller species, about 3–4 mm. in length. Brown species with mesonotum uniformly coloured, no darker longitudinal stripes 2
2. Thorax deep blue-black. Ocelli distinct . . . . . **megalyboides** Brun.
   Thorax dull blackish with a slight aeneous tinge . . . . . **longirostris** Hudson*

* Hudson has not described this species, the coloured illustration in his book is not good, the insect is unrecognisable. The first author who recognised the right position of the species and has described it was Osten-Sacken, 1896.

Helle rufescens Brunetti

1926. Ann. and Mag. Nat. Hist. IX, 18: 572.

Brunetti writes:

Head mainly as in *longirostris*, but occiput much narrower and front ocellus indefinite or absent.

Thorax bright brownish red, hind corners of prothoracic plates, which do not quite touch in the median line, narrowly pale yellow; dorsum with three contiguous broad black stripes; the middle one beginning on anterior margin of mesothorax, where it broadens a little, continuing to hind margin of dorsum, where it is considerably narrowed. Outer stripes beginning just in front of wing-base and ending, narrowed a little, on hind margin. Scutellum very globular, a little blackish on underside at base; metanotum more or less blackish.

Abdomen reddish, concolorous with thorax; a blackish, elongate, transverse spot with indefinite outline each side of median line on hinder half of each segment, more distinct on third, fourth, and fifth segments; base of each segment from fourth onwards more or less black and a little contracted. A fine microscopic whitish pubescence over all dorsum. Venter concolorous reddish with dorsum, a little blackish transversely at base of each segment.

Legs brownish yellow; femora, except tips for a short distance, obscurely brown; tips of tarsal joints narrowly brown.

Wings yellowish grey; venation as in *longirostris*, except for an extra cross-vein between third and fourth veins above tip of discal cell. All veins distinct. The elongate thickening of first vein yellowish brown, much less conspicuous than in *longirostris*. Squamae obscurely whitish, the yellow clubs of the halteres visible through them, their margins distinctly yellow.

Length 7 mm.

Type from Buller River, New Zealand, 29. xii. 1918 (G. V. Hudson, no. 47h). A second specimen labelled ?Buller Riv., N. Zeal. (collector's no. 47g), also collected by Hudson. Both in the British Museum.

The author has seen specimens from the following localities: New Zealand: 2♂♂, 20. xii. 1921, Mt. Arthur Tl., 4,500 ft. (A. Tonnoir); 1♂, 6. xi. 23, Nelson (A. Tonnoir); 1♂, 9. ii. 1921, Dun Mt., 3,000 ft. (R. J. Tillyard).

In one of the specimens from Mt. Arthur the additional vein at the apex of the discal cell is quite absent in both wings. The specimen from Nelson has it on both wings, situated rather far beyond the apex of the discal cell. In the fourth specimen it is present only on the right wing in the same position. The second specimen from Mt. Arthur has the additional vein exactly above the apex of the discal cell.

The occipital part of the head in profile is very narrow, about as broad as the anterior tibiae. In other species it is broader than the femora and much broader when viewed from above.

Helle longirostris Hudson

1896. Manual of New Zealand Entomology, 56, tab. vii, fig. 4. (Acrocera).

Osten-Sacken, 1896. Ent. Monthly Mag. (ser. 2, vii), 32: 16.

Brunetti, 1926. Ann. and Mag. Nat. Hist. IX, 18: 571.

Brunetti writes:

Redescription.—Head dull blackish; eyes quite bare, closely contiguous from just below small vertex to frontal triangle; latter bright orange. Ocellar triangle flush with eyes; ocelli brown, front ocellus small, distinct, the other two larger and less well defined. Antennae dark brown; face blackish; proboscis one and a half times as long as height of head, pale yellowish above, dark brown below, the basal sheath moderately dark brown, shining. Occiput very broad above, narrowing gradually to lower part, the latter still broad, whole margin with microscopic whitish hairs.

Thorax dull blackish, with a slight aeneous tinge, minutely punctate; outer margins of prothoracic plates and their hind corners more or less dull reddish yellow, sides and hind corners of dorsum, also pleurae and hind margin of scutellum similarly coloured, varying a little in intensity.

Abdomen dull blackish with a slight aeneous tinge, minutely punctate; hind margins of segments towards sides narrowly bright orange; extreme side margins of abdomen narrowly orange. Seen from in front, dorsum with rather dense, very short, fine, whitish pubescence. Venter black, hind margins of segments very narrowly orange, more or less interrupted. Genitalia mainly concealed.

Legs. Coxae and femora blackish brown, trochanters and tips of femora yellowish; tibiae and tarsi brownish yellow, dorsum of each tarsal joint blackish in middle; pulvilli yellowish, claws black.

Wings uniformly yellowish grey, all veins distinct; first vein with a spindle-shaped black thickened apical part; second and third veins practically parallel for their last two-thirds, third vein parallel with fourth vein as far as end of discal cell. An adventitious cross-vein sometimes occurs between third and fourth veins shortly beyond tip of discal cell, sometimes found in one wing only. No veins after third reaching wing-margin; fifth vein forming hinder side of discal cell for some distance, discal cell large; second basal cell longer than either first basal or anal. Squamae whitish, nearly transparent, margin barely obvious, through them can be seen the large yellow clubs of the halteres.

Length 3½–4 mm.

Three specimens in the British Museum appear to be this species. Wellington, New Zealand, 1. iii. 1910 (Capt. F. W. Hutton); Botanical Gardens, Wellington, 28. xi. 1906 (W. Wesché); Ngaio, N. Z., 21. xii. 1921 (G. V. Hudson, no. 306f). In the specimen captured by Wesché the adventitious cross-vein is present in the right wing only; in the one taken by Hutton it occurs only in the left wing; in the third specimen mentioned there is no trace of it in either wing.

This species was not described by Hudson, but he gave a coloured plate which simply portrays a blackish body, pale legs, unicolorous wings, with a venation which is not identical with that of *Helle*, but may be regarded as an indifferent copy of it. The apical thickening of the first vein certainly suggestive. Hudson sent a specimen of his species to Osten-Sacken, who described it (Ent. Month. Mag. (2) vii, p. 17, 1896), and through the inadequacy of Hudson's plate the authorship of the species should count to Osten-Sacken, though I do not suggest any alteration now. A specimen in the British Museum under this name, by whom identified I do not know, cannot be true *longirostris* and I describe it herein as *rufescens*.

D. Miller in his Catalogue of the Diptera of the New Zealand sub-region, (1950: 75), has transferred this species from the genus *Helle* to *Oncodes;* the reason for this is not stated. The genus *Helle* belongs to the subfamily *Philopotinae* and the transfer of this species to another subfamily *Oncodinae* cannot be accepted.

The type of *H. longirostris* apparently was not fixed and can be regarded as lost. Therefore the first recognisable description of Osten-Sacken should be regarded as the only valid one.

Helle megalyboides Brunetti

1926. Ann. and Mag. Nat. Hist. IX, 18: 573.

Brunetti writes:

Head mainly as in *longirostris*. Ocellar triangle flush with the eyes, wholly occupied by the three brownish ocelli, which are more distinct than in the other two species. Frontal triangle bright orange, a little prominent, below it a pair of whitish pubescent spots; antennae moderately light brown. Face black; proboscis one and a half times as long as height of head, pale yellow, tip blackish, sheath brownish yellow. Occipital margin very broad (as in *longirostris*), but sloping away rapidly from hind margin of eyes, deep blue-black, finely punctate.

Thorax deep blue-black, finely punctate; prothoracic plates quite contiguous in median line; outer and hinder angles rather broadly brownish yellow, the same colour occuring on propleurae, around wing-bases, narrowly thence to the reddish-orange hind margin of scutellum.

Abdomen of six segments, separated by deep incisions, deep blue-black, finely punctate, traces of orange narrowly towards sides of hind margins of segments. Whole dorsum of abdomen and venter with very short whitish pubescence, barely visible except from in front. Genitalia concealed. Whole abdomen in general outline (except for the deep inter-segmental incisions) subcylindrical, slightly narrowing from base to tip.

Legs. Coxae and femora black, tips of latter rather broadly but indefinitely yellowish. Tibiae and tarsi brownish yellow, dorsum of tarsal joints brownish except at base.

Wings yellowish grey; venation as in *longirostris*, the additional cross-vein between third and fourth veins present. Clubs of halteres yellow; squamae obscurely whitish, about basal half of disc (except margin) blackish brown; margins not differently coloured.

Length nearly 4 mm.

Described from two specimens in the British Museum: Wilton's Bush, Wellington, New Zealand, 27. xi. 1921 (G. V. Hudson, "206" (?c)), type; the second example labelled simply "New Zealand" (G. V. Hudson, "206a" and "47d").

The author has not seen this species. From the description by Brunetti it is evident that it is very closely related to *H. longirostris*. There is a possibility that it is only the other sex of *H. longirostris*.

Subfamily *ONCODINAE*
Genus ONCODES Latr. 1796

KEY TO THE NEW ZEALAND SPECIES OF ONCODES

1. Hairs on whole body yellowish . . . . . **O. consimilis** Brun. (♂, ♀)
   Hairs on whole body black, or dark brown **2**
2. Abdomen black . . . . . **O. nitens** Hutt.
   Abdomen dark-brown, with narrow yellowish margins on tergites . . . . . **O. brunneus** Hutt.

Oncodes brunneus Hutton

1881. Cat. Dipt. New Zeal. p. 24; 1901. New Zeal. Inst., Trans. 33: 29.

Maskell, 1888. New Zeal. Inst., Trans. 20: 106–108, pl. 10 (Henops).

Brunetti, 1926. Ann. and Mag. Nat. Hist. IX, 18: 593–594.

Maskell writes:

Flies (fig. 1) rather large, but squat-looking and heavy; motions very slow. Thorax much elevated, the head being bent down beneath it so as not to be visible when the insect is viewed from above. Abdomen round and swollen, wider than the thorax but seeming as if cut off short, the posterior extremity being turned under; there are six segments on the abdomen. *Colour* dark brown, almost black, on the thorax, with short yellow hairs; abdomen dark brown, with a yellow band marking each segment; head black; Wings hyaline; halteres yellow. The winglets are very large and scale-like. *Eyes* very large, compound, occupying all the upper part of the head, but not highly convex (fig. 2). *Antennae* (fig. 3) inserted in front, between the eyes; two-jointed, both joints very short; the style is very long, inflated near the base, narrow in the shaft and slightly dilated at the tip, where there are two short bristles. *Proboscis* (fig. 2) very short, almost obsolete, conical; placed so much beneath the down-turned head as to be extremely difficult to detect. *Feet* (fig. 5) long and slender; tarsus five-jointed; claw double (fig. 6) with three pulvilli. *Wings* (fig. 4) with brown costal and subcostal veins; discoidal cell open; cubital cell large; and postical vein appears to have a branch almost if not quite disconnected. Length of the body, in the usual postion, nearly $\frac{1}{5}$ inch.

Hutton, 1901, writes:

Head black; antennae pitch-brown. Thorax pitch-brown, with scattered tawny hairs. Abdomen brown, the posterior margin of each segment tawny. Legs pale-brown. Wings hyaline; the costa and second longitudinal vein brown. Length, 5–6 mm.; wing, 5–7 mm.

Hab. Otago (F.W.H.); Wairarapa (Maskell); Auckland (Broun).

Brunetti writes:

A short series in the British Museum from New Zealand, some labelled Wellington, 3. ii. 1911 (Capt. F. W. Hutton); Christchurch, Ohakune, v. 1922 (J. W. Campbell), others with no closer data.

A further series from New Zealand amongst the unnamed material in the British Museum have nearly or entirely clear wings, and the legs showing much variation, being in individuals entirely and quite black, in others shining brown varying in intensity and extent, in others again with the tibiae all brownish yellow. The data are as follows:—Wilton's Bush, Wellington, 28. xi. 1921; 6. xii. 1920; Karori, Wellington, 28. i. 1917; 16. ii. 1920; Gollans Valley, 24. xii. 1921 (all G. V. Hudson). Ohakune, 1922–23 (T. R. Harris). The specimen from Gollans Valley has a pale irregularly-shaped spot of some size, but with indefinite outline towards each side margin on the third segment.

The author has seen only one specimen: 1 ♀, 23. xii. 1924, Dun Mt., 3,000 ft., N. Z. (A. Philpott).

Oncodes consimilis Brunetti

1926. Ann. and Mag. Nat. Hist. IX, 18: 603.

Brunetti writes:

Considerably like *O. basalis* Walk. The pubescence of the thorax is more yellowish, that of the abdomen is distinctly longer, rather conspicuously whitish, the clear-cut yellow hind margins of the segments being quite bare (as is the case also in *basalis*). The first and second abdominal segments are all black, the third, fourth, fifth, and sixth mainly blackish brown on more than the basal half of each, the remaining portion paling to a bright yellowish brown; the black spots at the sides of the segments are less clearly demarcated, larger, more triangular, and almost united to the blackish-brown basal band. The femora are much more slender in form, brownish yellow, indistinctly darker distally; the tibiae brownish yellow, the tarsi mainly black but first joint brownish yellow on basal half or more.

Length 6 mm.

A single specimen from Mount Ruapehu, New Zealand, 4,000 ft., Jan. 1922 (G. V. Hudson).

Unique type in British Museum.

Apart from the first and second abdominal segments, which are wholly black in both species (except for the whitish hind margin of second segment in each), the ground-colour of the rest of the abdomen in *consimilis* is blackish brown, shading into brownish yellow posteriorly; but in *basalis* it is bright brownish yellow, with the black spots clearly cut on third and fourth segments. In the type of *basalis* the pubescence of the thorax and abdomen is more yellowish, that of the abdomen much shorter than in *consimilis*; the black in the femora is on the basal half only and sharply defined, the femora themselves stouter and more uniformly cylindrical; the tibiae uniformly bright orange and the tarsi wholly black from base to tip. The wings in *consimilis* are absolutely colourless and the squamae nearly as clear, although not actually transparent; in *basalis* the wings are yellowish grey, the squamae obscurely whitish.

The author has seen specimens from the following localities: 2 ♂♂, 30. xi. 1921, Khandallah, N. Z. (A. Tonnoir); 1 ♂, 1 ♀, 2. xii. 1921, Wilton's Bush, N. Z. (A. Tonnoir); 1 ♂, 5–7. i. 1922, Dun Mt., 3,000 ft., N. Z. (A. Tonnoir).

Oncodes nitens Hutton

1901. New Zeal. Inst., Trans. 33: 29.

(Henops).

Hutton writes:

> Shining black, with black hairs on the thorax and abdomen. The tibiae, except their bases, the tarsi, except the last joint of each, and a spot on each side of the second and third abdominal segments, tawny. Wings hyaline. Length, 5–6½ mm.; wing, 4½–5 mm.
>
> Hab. Auckland (Broun); Wellington (Hudson).

SUMMARY

To the present time no review of the New Zealand Cyrtidae has been published. Although the cyrtid fauna is very meagre (only 3 genera [3 subfamilies] with 7 species), it is very difficult to identify them, because the descriptions lack the completeness required by modern systematics. The author has given all the necessary additional data to bring our knowledge up to date, and also hopes to stimulate the discovery of additional species.

The comparison of the New Zealand cyrtid fauna with that of Australia and America, shows that it is much closer to the American than to Australian fauna. The cause of the absence of some families of Diptera was also discussed.

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